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### REMARKS

Claims 1-44 are all the claims presently pending in the application. Claims 1-11, 39, 40, 42, and 43 are elected. Claims 1-5, 39, 40, 42, and 43 are generic to all species of the invention. Claims 12-28, 41, and 44 are withdrawn from consideration as being directed to non-elected species. Claims 1, 6, 7, 42, and 43 have been amended to define more clearly the features of the present invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability.

Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-11, 39, 40, 42, and 43 are objected. Claims 6-11 also are objected under 37 C.F.R. § 1.75(c). Claims 1-11, 39, 40, 42, and 43 stand rejected under 35 U.S.C. § 112, second paragraph. Claims 1-7, 39, 42, and 43 stand rejected on prior art grounds under 35 U.S.C. § 103(a) as being obvious over Liefke ("An Extensible Compressor for XML Data, Liefke SIGMOD Record, Vol. 29, No. 1, March 2000).

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

The claimed invention is directed to a method of compressing an extensible markup language (XML) document, including compressing an XML document and its associated schema information such that information in a markup portion therein is maintained in a compressed form to allow the document to be reconstructed, wherein,

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during the compressing, the markup portion and a non-markup portion of the document are separated, and the non-markup portion is compressed using a first compression method and the markup portion is compressed using a second compression method.

Hence, the present invention not only takes advantage of the separation of the structure and data of an XML document, but it also takes advantage of the associated schema (e.g., DTD) of the document to perform optimization (e.g., see specification at page 4, lines 19-21). The schema describes the constraints on the structures, possible values, and occurrence restrictions of attribute values and elements. The compression algorithm, once it knows that there is a schema associated with the document, takes advantage of this and produces further compression of the data.

The claimed invention provides an efficient compression algorithm for XML documents in which the XML documents are compressed, and such that the structural information will be kept in the compressed form so that the documents can be easily reconstructed. The invention provides a lossless compression algorithm that gets as close as possible to the ZLIB algorithm. Hence, with the claimed invention, the markup (structure) and non- markup (data) can be separated , and the non-markup component can be compressed using ZLIB and the markup component can be compressed using binary encoding. (E.g. see specification at page 5, lines 4-10).

Thus, with the unique and unobvious aspects of the claimed invention, the schema information (the DTD associated with the document) can be used to compress the structure component and obtain higher compression rate while simultaneously retaining the structure. Further, the claimed invention provides better compression rates for small

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documents (like eBusiness transactions) than GZIP and other conventional schemes.  
(E.g. see specification at page 5, lines 10-15).

## II. REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 1-11, 39, 40, 42, and 43 stand rejected under 35 U.S.C. § 112, second paragraph.

Claims 1, 6, 7, 42, and 43 are amended above to define more clearly the features of the present invention, thereby overcoming the rejection under § 112, and therefore, the Examiner is respectfully requested to withdraw this rejection.

As for the rejection of claim 2, the Office Action states that claim 2 does not provide sufficient "comparative" basis for the limitation "a predetermined higher compression rate". Applicants respectfully disagree and submit that claim 2 recites "a predetermined higher compression rate", and thus, the claim is clear without comparison to another element.

As for the rejection of claims 6-11 as being unclear as to how the "definitions" relate to a method of compressing a document, Applicants note that claim 6 recites "is defined in", not "is defined as". Thus, claim 6 is clear as written.

On the other hand, claim 7 is amended merely to define more clearly the features of the invention.

In view of the foregoing, Applicants submit that a person of ordinary skill in the art clearly would know the metes and bounds of the subject matter of claims 1-11, 39, 40, 42, and 43, and the Examiner is respectfully requested to reconsider and withdraw this rejection.

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### III. THE LIEFKE REFERENCE

Claims 1-7, 39, 42, and 43 stand rejected on prior art grounds under 35 U.S.C. § 103(a) as being obvious over Liefke ("An Extensible Compressor for XML Data, Liefke SIGMOD Record, Vol. 29, No. 1, March 2000). For at least the following reasons, Applicants respectfully traverse this rejection.

The Office Action acknowledges that Liefke does not explicitly teach or suggest that the non-markup portion is compressed using a first compression method and the markup portion is compressed using a second compression method. However, the Office Action asserts that Liefke does teach that a novelty of XMILL is that it allows users to combine existing compressors in order to compress heterogeneous XML data, as set forth at page 57, first column, lines 9-11 of Liefke. The Office Action alleges that it would have been obvious to modify Liefke to arrive at the claimed invention, since Figure 1 of Liefke (see page 59 of Liefke) allegedly demonstrates that the structure container is compressed using gzip as the default and that the data container 1 through data container k each are compressed first using a semantic compressor then using gzip as the default compressor. (See Office Action at page 4, lines 8-19.) Applicants respectfully disagree.

Independent claim 1 recites, *inter alia*:

compressing an XML document and its associated schema information such that information in a markup portion therein is maintained in a compressed form to allow the document to be reconstructed;

wherein, during said compressing, said markup portion and a non-markup portion of said document are separated, and the non-markup portion is compressed using a first compression method and the markup portion is compressed using a second compression method.

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The unique and unobvious features of the present invention not only take advantage of the separation of the structure and data of an XML document, but also take advantage of the associated schema of the document to perform optimization (e.g., see specification at page 29, lines 1-7). That is, the schema (e.g., DTD) describes the constraints on the structures, possible values, and occurrence restrictions of attribute values and elements. The compression algorithm, once it knows that there is a schema associated with the document, takes advantage of this and produces further compression of the data.

Therefore, with the unique and unobvious aspects of the claimed invention, the schema information (e.g., the DTD associated with the document) can be used to compress the structure component and obtain a higher compression rate while simultaneously retaining the structure and the present invention can provide an efficient compression algorithm for XML documents in which the XML documents are compressed, such that the structural information can be kept in the compressed form so that the documents can be easily reconstructed (e.g., see specification at page 4, lines 1-7).

With respect to the prior art rejection, Applicants submit that neither Liefke, nor the prior art in general, provides a reasonable motivation or suggestion for modifying Liefke to arrive at the claimed invention.

On the contrary, since Liefke specifically discloses that it “does not need a DTD in order to compress”, Applicants submit that Liefke does not even contemplate (or for that matter, disclose or suggest) the claimed invention, but instead, teaches away from the

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claimed invention (e.g., see Liefke at page 57, first column, first paragraph, lines 6-7; emphasis added).

Applicants submit that independent claims 42 and 43 also are not rendered obvious from Liefke for similar reasons.

Dependent claims 2-11, 39, and 40 also are patentable over Liefke by virtue of their dependency from independent claim 1, as well for the additional recitations therein.

For example, with respect to claim 2, Applicants respectfully submit that Liefke neither discloses nor suggests all of the recitations of claim 2.

As the Examiner points out, Liefke specifically states that “[i]t does not need a DTD in order to compress” (e.g., see Liefke at page 57, first column, first paragraph, lines 6-7; emphasis added). However, the Office Action seems to allege that this statement discloses that Liefke does use the schema information associated with the document with compressing the structure component. |

Applicants respectfully disagree and submit that by explicitly stating that it does not need DTD in order to compress, Liefke clearly does not disclose or suggest “wherein said schema information associated with the document is used with compressing the structure component” as recited in dependent claim 2. Thus, claim 2 clearly is patentable over Liefke and Applicants request that the Examiner withdraw this rejection.

For at least the following reasons, Applicants submit that there are elements of the claimed invention that are not taught or suggested by Liefke. Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 1-11, 39, 40, 42, and 43.

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#### IV. THE W3C REFERENCE

Claims 8-11 and 40 stand rejected on prior art grounds under 35 U.S.C. § 103(a) as being obvious over Liefke in view of WAP Binary XML Content Format, W3C Note June 24, 1999 (hereinafter "W3C"). For at least the following reasons, Applicants respectfully traverse this rejection.

As set forth above, Applicants submit that it would not have been obvious to modify Liefke to arrive at the claimed invention recited in independent claim 1. Moreover, W3C (which is discussed by Applicants in the specification at page 7, lines 15-16) also does not provide a reasonable motivation or suggestion for modifying Liefke to arrive at the claimed invention.

For example, the Examiner alleges that it would have been obvious to combine Liefke with W3C to arrive at the claimed invention, since Liefke states that XMILL allows users to combine existing compressors in order to compress heterogeneous XML data and because such a combination would allow users of Liefke the benefit of a binary XML content format designed to reduce the transmission size of XML documents, allowing more effective use of XML data (see Office Action at pages 7-8, bridging paragraph).

However, as Applicants describe in the specification at page 7, lines 19-21, the binary encoding component which retains the structure occupies approximately twice as much space as the ZLIB equivalent that loses structure. On the other hand, Liefke specifically discloses that, although GZIP is referred to throughout the document, it is in fact the ZLIB library function (e.g., see Liefke at page 58, second column, lines 1-3; see also Footnote 4).

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Moreover, when discussing the compression of the structure, Liefke states that "gzip" compresses "the structure container extremely well" (e.g., see Liefke at page 59, first column, third paragraph, lines 3-4). Thus, Liefke provides no reasonable motivation to replace the GZIP (or ZLIB) with a binary format.

Accordingly, it would not have been obvious to combine the binary XML content format of W3C with Liefke for the purpose of reducing the transmission size of XML documents, as alleged by the Office Action.

Applicants respectfully submit that a person of ordinary skill in the art would not have been motivated to modify Liefke in view of M3C to arrive at the claimed invention, absent impermissible hindsight, and the Examiner is respectfully requested to withdraw this rejection.

#### **V. REQUEST FOR REJOINDER OF NON-ELECTED CLAIMS**

Applicants respectfully request that the Examiner rejoin and allow non-elected claims 12-38 at least by virtue of their dependency from generic claim 1, which should be allowable for the reasons set forth above.

#### **VI. FORMAL MATTERS AND CONCLUSION**

The Office Action objects to claims 1-11, 39, 40, 42, and 43 because of informalities. Claims 1, 6, 7, 42, and 43 are amended herewith to obviate this objection. The Examiner is respectfully requested to withdraw this objection.

Claims 6-11 also are objected under 37 C.F.R. § 1.75(c) as failing to further limit the subject matter of the previous claim because they allegedly recite definitions and



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introduce terms that do not relate to claim 1. Applicants respectfully disagree and, for similar reasons to those set forth above (with respect to the rejection under 35 U.S.C. § 112, second paragraph), submit that these claims clearly define with more particularity the features of independent claim 1. Thus, Applicants request that the Examiner withdraw the objection of claims 6-11 and consider each of the additional elements recited in these claims.

In view of the foregoing, Applicants submit that claims 1-44, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 09-0441.

Respectfully Submitted,

Date: April 12, 2004

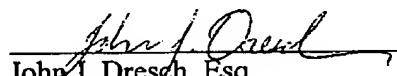
  
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CERTIFICATE OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 872-9306 the enclosed Amendment under 37 C.F.R. § 1.111 to Examiner Nathan Hillery on April 12, 2004.

  
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